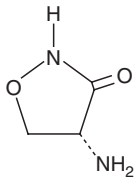
PRODUCT INFORMATION

D-Cycloserine

Item No. 22194

CAS Registry No.: 68-41-7
Formal Name: 4R-amino-3-isoxazolidinone
Synonyms: (+)-Cycloserine, α-Cycloserine
(R)-Cycloserine, NSC 76029, NSC 15481
MF: $C_3H_6N_2O_2$
FW: 102.1
Purity: ≥95%
UV/Vis.: λ_{max}: 225 nm
Supplied as: A crystalline solid
Storage: -20°C
Stability: ≥4 years



Information represents the product specifications. Batch specific analytical results are provided on each certificate of analysis.

Laboratory Procedures

D-Cycloserine is supplied as a crystalline solid. A stock solution may be made by dissolving the D-cycloserine in the solvent of choice, which should be purged with an inert gas. D-Cycloserine is soluble in the organic solvent DMSO at a concentration of approximately 10 mg/ml.

Further dilutions of the stock solution into aqueous buffers or isotonic saline should be made prior to performing biological experiments. Ensure that the residual amount of organic solvent is insignificant, since organic solvents may have physiological effects at low concentrations. Organic solvent-free aqueous solutions of D-cycloserine can be prepared by directly dissolving the crystalline solid in aqueous buffers. The solubility of D-cycloserine in PBS (pH 7.2) is approximately 10 mg/ml. We do not recommend storing the aqueous solution for more than one day.

Description

D-Cycloserine is an NMDA receptor (NMDAR) partial agonist with antibiotic activity. It selectively binds to the glycine binding site (K_i = 2.33 µM) over the glutamate binding site (K_i = >100 µM).[1] D-Cycloserine modulates memory in a T-maze footshock test in CD-1 mice with optimal memory retention at doses of 10-30 mg/kg.[2] Administration of D-cycloserine (20-40 mg/kg) improves memory retention in 'senescence-accelerated' mice which exhibit impaired learning and memory. D-Cycloserine inhibits L-alanine racemase and D-alanine:D-alanine ligase, enzymes essential to peptidoglycan synthesis and bacterial cell wall formation.[3] Formulations containing D-cycloserine have been used as second-line agents to treat drug-resistant tuberculosis.[4]

References

1. Hood, W.F., Compton, R.P., and Monahan, J.B. D-cycloserine: A ligand for the N-methyl-D-aspartate coupled glycine receptor has partial agonist characteristics. *Neurosci. Lett.* **98(1)**, 91-95 (1989).
2. Flood, J.F., Morley, J.E., and Lanthom, T.H. Effect on memory processing by D-cycloserine, an agonist of the NMDA/glycine receptor. *Eur. J. Pharmacol.* **221(2-3)**, 249-254 (1992).
3. Feng, Z. and R.G. Barletta. Roles of *Mycobacterium smegmatis* D-alanine:D-alanine ligase and D-alanine racemase in the mechanisms of action of and resistance to the peptidoglycan inhibitor D-cycloserine. *Antimicrob. Agents Chemother.* **47(1)**, 283-291 (2003).
4. Caminero, J.A., Sotqiu, G., Zumla, A., *et al.* Best drug treatment for multidrug-resistant and extensively drug-resistant tuberculosis. *Lancet Infect. Dis.* **10(9)**, 621-629 (2010).

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